Brandon Leung

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Education

University of California, San Diego (UCSD) **Sep. 2015 – Dec. 2021 (Expected)**

- **Current M.S. student in Machine Learning & Data Science**, expected graduation December 2021. GPA 3.86.
- **B.Sc. in Computer Science**, graduated August 2019. GPA 3.88 (Magna Cum Laude, with highest distinction).

Relevant coursework: *Statistics, Statistical Machine Learning, Computer Vision, Linear Algebra, Recommender Systems, Robotics Planning/Learning/Sensing, Algorithm Analysis/Design, Operating Systems, Computer Networking, Computer Security, Theory of Computation, Computer Architecture.*

Research Interests & Experience

- **2D Computer Vision** (recognition, detection, semantic segmentation).
- **3D Computer Vision** (recognition, detection, single view reconstruction, 3D completion).
- **Deep Learning** (unsupervised learning, adversarial attacks, continual learning, long-tailed learning, robustness, network distillation).
- **Transfer Learning** (low-shot learning, meta learning, transfer learning, domain adaptation).
- **NLP** (sentiment analysis, clustering, style transfer, generative modeling).
- **Statistics/Data Science** (Bayesian & Frequentist statistical modeling, regression models, hypothesis testing).

Significant Projects

Drone Flight Dataset for Neural Network Vision Assessment **(Jun. 2017 – Present)**

- Project leader & main developer of a novel drone flight system, recruiting 13 to collect a 120,000 image dataset.
- Published to CVPR; conducted experiments showing severe vulnerabilities (30% drop) in neural networks like ResNet to pose & camera shake. Extensively used Python, PyTorch, OpenCV, and ROS in an Ubuntu environment.

Improving 3D Reconstructions with Self-Supervised Machine Learning **(Aug. 2020 – Present)**

- Developed a novel neural network refinement algorithm to generate 3D meshes from a single image.
- Used self-supervised learning & symmetry regularization; beats state-of-the-art (up to 47%), across many datasets.

Self-Driving Cars using 2D/3D Action and Explanation Prediction **(Feb. 2021 – Present)**

- Guided formulation & development of a model fusing 2D images & 3D pointclouds for self-driving car navigation.
- 2D & 3D explanations from Faster R-CNN & MVX-Net are jointly predicted with actions, justifying model decisions.
- Annotated new action & explanation annotations labels from Amazon Turk to add to the Waymo Open dataset.

Statistical Linguistic Analysis for User Chat Message Logs **(Feb. 2021 – Jul. 2021)**

- Built an interactive dashboard to analyze user chat logs and describe their linguistic behavior.
- Applied NLP transformer models (RoBERTa, GPT-2) to sentiment analysis, clustering, style transfer, & generation.
- Developed with Voilà. Tested with pytest and documented with Sphinx. Deployed using AWS (EC2 and S3).

Publications

Catastrophic Child's Play: Easy to Perform, Hard to Defend Adversarial Attacks **Published, CVPR 19**
Brandon Leung, Chih-Hui Ho, Erik Sandstrom, Yen Chang, and Nuno Vasconcelos

Black-Box Test-Time Shape REFINEment for Single View 3D Reconstruction **In progress, MS Thesis**
Brandon Leung

Explainable 3D Object-Induced Action Decisions for Autonomous Vehicles **In progress, CVPR 22**
Arth Dharaskar, Allen Cheung, Brandon Leung, Chih-Hui Ho, and Nuno Vasconcelos

Professional Experience

Graduate Student Researcher **Statistical Visual Computing Lab, UCSD** **Jun. 2017 - Now**

- Researching deep learning based computer vision under Prof. Nuno Vasconcelos, with a focus in 2D/3D detection, domain adaptation, GANs, 3D reconstruction, self-supervised learning, and explainable neural networks.

Software Engineer, Intern **Himax Imaging** **Summers 2015 & 2016**

- Developed internal quality control programs in Java for a R&D/fabrication company specializing in CMOS image sensors used in smartphone cameras and car backup cameras.

AWARDS

- **NSF Graduate Research Fellowship**, Mar. 2020.
- **Sloan Foundation Graduate Research Fellowship**, Sep. 2019.
- **STARS Graduate Fellowship**, Sep. 2019.
- **UCSD ECE Departmental Graduate Fellowship**, Sep. 2019.
- **UCSD Undergraduate Research Award**, awarded to 2 graduating UCSD ECE students each year, May 2019.
- **Qualcomm Alumni Scholarship**, Sep. 2018.
- **NSF REU Research Grant**, Sep. 2018.
- **Phi Beta Kappa Academic Honor Society Inductee**, Jun. 2018.
- **Ledell Research Scholarship** for Science and Engineering, Jun. 2018.
- **Caledonian Honor Society Inductee**, Muir College at UCSD, May 2018.
- **University of California LEADS Scholarship**, Apr. 2017.

TEACHING EXPERIENCE

TA, Data Science Theoretical Foundations II **UCSD** **Fall Quarter 2018**

- DSC 40A, with Professor Janine Tiefenbruck.

TA, Data Science Theoretical Foundations II **UCSD** **Spring Quarter 2018**

- DSC 40B, with Professor Janine Tiefenbruck.

TA, Introduction to Programming Java **UCSD** **Winter Quarter 2018**

- CSE 8A, with Professor Christine Alvarado.

ADDITIONAL EXPERIENCE

IT Technician **UCSD** **Aug. 2016 – Feb. 2017**

- Provided tier 1 networking, software, and hardware IT support for the over 35,000 students and staff at UCSD.

RMA Technician **Alpha Networks** **Summer 2014**

- Troubleshot and repaired routers, modems, switches, and other networking components at Alpha Network's RMA division.

OUTREACH & MENTORSHIP

SRIP Research Mentor **UCSD** **Summers 2018 – 2021**

- Mentored UCSD students in the Spring/Summer Research Intern Program (SRIP) to do computer vision research.

GEAR Research Mentor **UCSD** **2019 – 2020**

- Mentored UCSD students in the Guided Engineering Apprenticeship in Research (GEAR) program to do computer vision research.

ENLACE Research Mentor **UCSD** **Summers 2018 & 2019**

- Mentored students in ENLACE, a high school outreach program promoting diversity in research, especially in Hispanic communities.

ACADEMIC SERVICES

Conference Reviewer

- ECCV 2020 Workshop on Imbalance Problems in Computer Vision (IPCV)
- ICCV 2021
- CVPR 2021

TECHNICAL SKILLS

- **Expertise in:** Python, PyTorch, PyTorch3D, OpenCV, Numpy, Pandas, Plotly, Jupyter Notebooks, pytest, Sphinx, Bash, Docker, Kubernetes, Vim.
- **Experience with:** Java, C, HTML/CSS, JavaScript, AWS, Matlab.

LANGUAGES

English, Cantonese.